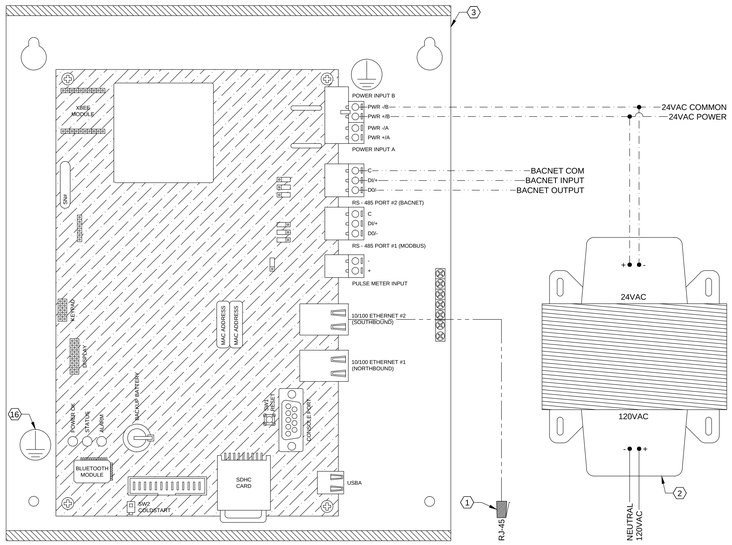
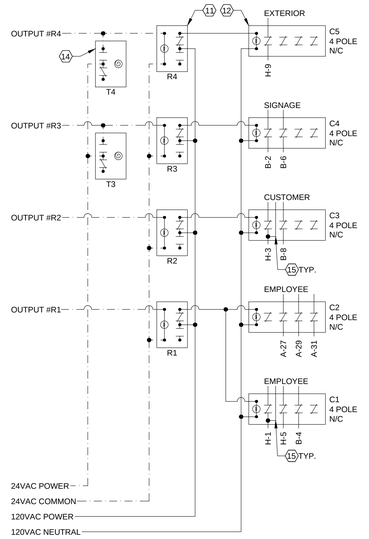
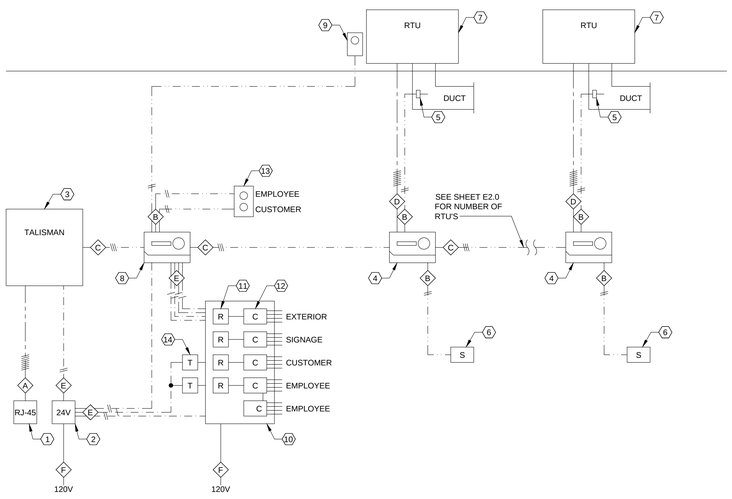


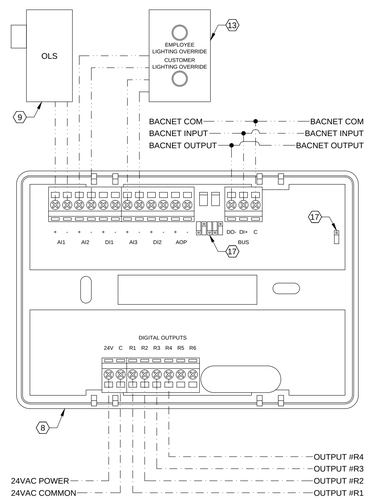
3 TALISMAN MASTER CONTROLLER
E4.0 SCALE: NONE



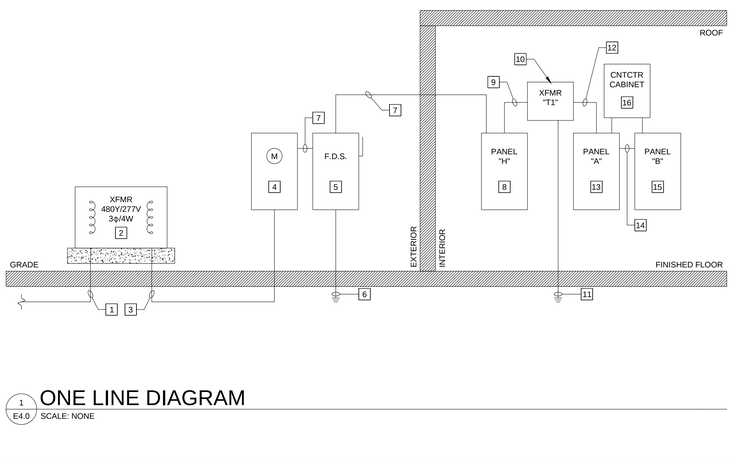
6 RELAYS & CONTACTORS
E4.0 SCALE: NONE



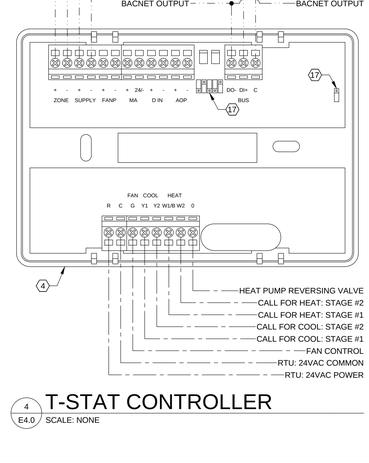
2 EMS ONE LINE DIAGRAM
E4.0 SCALE: NONE



5 LIGHTING CONTROLLER
E4.0 SCALE: NONE



1 ONE LINE DIAGRAM
E4.0 SCALE: NONE



4 T-STAT CONTROLLER
E4.0 SCALE: NONE

KEYNOTES
ENERGY MANAGEMENT SYSTEM

1. NETWORK CONNECTION: PROVIDE RJ-45 ON TELEPHONE BOARD FOR SYSTEMS NETWORK CONNECTION.
2. POWER SUPPLY XFMR: PROVIDE 75VA, 120VAC TO 24VAC TRANSFORMER, FUNCTIONAL DEVICES' MODEL #PSH75AWU, WITH ENCLOSURE FOR SYSTEM POWER.
3. TALISMAN MASTER CONTROLLER: CONFIGURE PER MANUFACTURERS INSTRUCTIONS.
4. T-STAT CONTROLLER: CONFIGURE PER MANUFACTURERS INSTRUCTIONS. PROVIDE PERMANENT LABEL INDICATING RTU SERVED.
5. DUCT TEMPERATURE SENSOR:
6. ZONE TEMPERATURE SENSOR:
7. ROOF TOP UNIT: CONNECT T-STAT CABLE TO APPROPRIATE TERMINALS IN RTU CONTROL SECTION.
8. LIGHTING CONTROLLER: CONFIGURE PER MANUFACTURERS INSTRUCTIONS.
9. OUTDOOR LIGHT SENSOR: OUTDOOR RATED, ANALOG PHOTOCELL IN WATER PROOF BOX.
10. LIGHTING CONTACTOR CABINET: ENCLOSURE FOR LIGHTING RELAYS AND LIGHTING CONTACTORS. SIZE AS REQUIRED TO HOUSE ALL COMPONENTS.
11. LIGHTING RELAY: SPDT PILOT RELAY, FUNCTIONAL DEVICES' MODEL #RIB2421C, WITH 24VAC COIL & 10A CONTACTS AT 120 VOLTS.
12. LIGHTING CONTACTOR: LIGHTING CONTACTOR, GE MODEL #CR460, WITH 30A, NORMALLY CLOSED CONTACTS AND 120VAC COIL.
13. INTERIOR OVERRIDE SWITCH: TWO PUSHBUTTON OVERRIDE SWITCH FOR INTERIOR LIGHTING. PROVIDE PERMANENT LABELS STATING "EMPLOYEE LIGHTING OVERRIDE" & "CUSTOMER LIGHTING OVERRIDE".
14. EXTERIOR OVERRIDE SWITCH: AUTO-OFF TIMER, INTERMATIC MODEL #FF72H, WITH 2 HOUR TIME CYCLE, NO HOLD FEATURE, SPDT SWITCH AND 20A, 120VAC CONTACTS. PROVIDE PERMANENT LABELS STATING "EXTERIOR SIGNAGE OVERRIDE" & "EXTERIOR LIGHTING OVERRIDE".
15. UN-SWITCHED CONDUCTOR: CONNECT AHEAD OF CONTACTS FOR CONSTANT HOT TO EMERGENCY LIGHTS OR EXHAUST FAN.
16. SYSTEM GROUND: PROVIDE #12 CU GROUND PER SHOP DRAWINGS.
17. DEVICE JUMPERS: SET DEVICE JUMPERS PER SHOP DRAWINGS.

KEYNOTES
ONE LINE DIAGRAM

1. UTILITY FEEDERS: NEW FEEDER SIZE & ROUTING PER UTILITY REQUIREMENTS. COORDINATE WITH UTILITY PRIOR TO BID.
2. UTILITY TRANSFORMER: NEW CONCRETE PAD PER UTILITY REQUIREMENTS COORDINATE INSTALLATION WITH UTILITY.
3. SERVICE FEEDERS (200A): NEW (4) #3/0, Cu, XHHW, IN 2" CONDUIT.
4. METERING EQUIPMENT: NEW 200A METERING EQUIPMENT PER UTILITY REQUIREMENTS. COORDINATE INSTALLATION WITH UTILITY.
5. MAIN DISCONNECT: NEW EXTERIOR, NEMA 3R, 200A, FUSED DISCONNECT WITH (3) 200A LPJ FUSES AND SOLID NEUTRAL.
6. SERVICE GROUND: NEW SERVICE GROUND. #4 Cu TO WATER MAIN, BUILDING STEEL, FOOTING GROUND AND GROUND ROD PER NEC.
7. PANEL "H" FEEDERS (200A): NEW (4) #3/0, (1) #6 GR., Cu, XHHW, IN 2" CONDUIT.
8. PANEL "H": NEW 480Y/277V PANEL. SEE PANEL SCHEDULE.
9. XFMR "T1" FEEDERS (70A): NEW (3) #4, (1) #8 GR., Cu, XHHW, IN 1" CONDUIT.
10. XFMR "T1": NEW 45kVA, NEMATP-1, 480Δ - 208Y/120V TRANSFORMER.
11. XFMR "T1" GROUND: NEW #4 Cu GROUND TO BUILDING STEEL PER NEC.
12. PANEL "A" FEEDERS (150A): NEW (4) #1/0, (1) #6 GR., (1) #6 I.G., Cu, XHHW, IN 2" CONDUIT.
13. PANEL "A": NEW 208Y/120V PANEL. SEE PANEL SCHEDULE.
14. PANEL "B" FEEDERS (150A): SAME AS PANEL "A" FEEDERS, VIA FEED-THROUGH LUGS IN PANEL "A".
15. PANEL "B": NEW 208Y/120V PANEL. SEE PANEL SCHEDULE.
16. CONTACTOR CABINET: NEW NEMA 1, ENCLOSURE FOR LIGHTING CONTACTORS AND RELAYS. MOUNT ABOVE ELECTRICAL PANELS. SEE EMS DIAGRAMS (E4.0).

GENERAL NOTES
ENERGY MANAGEMENT SYSTEM

A. THE ENERGY MANAGEMENT SYSTEM (EMS) IS A BACNET BASED SYSTEM FROM QUEST CONTROLS INC. THE SYSTEM IS DESIGNED BY QUEST CONTROLS ON A PROJECT SPECIFIC BASIS. SHOP DRAWINGS REVIEWED BY THE PROFESSIONAL OF RECORD IS REQUIRED.

B. ALL EMS EQUIPMENT SHALL BE FURNISHED AND INSTALLED AS INDICATED IN EQUIPMENT SCHEDULE. MECHANICAL CONTRACTOR MUST ORDER FROM QUEST CONTROLS, NO EXCEPTIONS. CONTACT QUEST CONTROLS ORDERING CONTACT FOR PRICING. COORDINATE DELIVERY WITH QUEST. SEE SHEET F2.0 FOR CONTACT INFORMATION. ELECTRICAL CONTRACTOR SHALL FURNISH AUXILIARY EQUIPMENT AS SHOWN OR EQUAL.

C. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SUPPLYING ALL CONDUIT, WIRE, PULL BOXES, AND JUNCTION BOXES REQUIRED FOR A COMPLETE INSTALLATION.

D. WIRING SHALL BE CONCEALED WHERE POSSIBLE. WHEN NOT SUBJECT TO DAMAGE, AND LOCAL CODES PERMIT, WIRING MAY BE RUN OPEN, SECURED AT REGULAR INTERVALS. ALL EXPOSED CABLES TO BE RUN AND CONCEALED IN THE ANGLE OF THE BAR JOIST AND NEATLY WIRE-TIED TO BAR JOIST, NOT DRAPED BETWEEN BRACES. SAGGING WIRES ARE NOT PERMITTED.

E. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR GROUND TO EMS CONTROLLER. ALL SHIELDED WIRE MUST BE TERMINATED TO GROUND AT THE QUEST PANEL END ONLY. AT SENSOR, CUT SHIELD OFF AND TAPE END.

F. ELECTRICAL CONTRACTOR SHALL SET DEVICE ADDRESSES PER QUEST INSTALLATION DRAWINGS.

G. ALL WORK SHALL CONFORM WITH THE LOCAL, STATE, & NATIONAL ELECTRICAL CODES. ELECTRICAL CONTRACTOR SHALL PAY FOR ALL INSPECTIONS AND PERMITS.

H. LOW VOLTAGE CONDUCTORS SHALL MAINTAIN A MINIMUM 1/4" CLEARANCE FROM POWER CONDUCTORS.

I. ELECTRICAL CONTRACTOR SHALL LABEL ALL WIRES AND CABLES ON BOTH ENDS.

J. ELECTRICAL CONTRACTOR SHALL SUBMIT RFI THRU PETSMART WEBSITE FOR ANY QUESTIONS REGARDING EMS SYSTEM DRAWINGS OR INSTALLATION.

K. WHEN THE MECHANICAL & ELECTRICAL CONTRACTOR HAS COMPLETED INSTALLATION OF THE EMS SYSTEM AND COORDINATED WORK WITH MECHANICAL CONTRACTOR, THE MECHANICAL & ELECTRICAL CONTRACTORS SHALL COORDINATE START-UP AND COMMISSIONING WITH QUEST CONTROLS & PETSMART CONSTRUCTION MANAGER.

CONTROL SETTINGS
ENERGY MANAGEMENT SYSTEM

T-STAT CONTROLLER:

OCCUPIED COOLING: (6:00 AM - 10:00 PM) - SET TEMPERATURE TO 74°F IN SALON / BATHING / DRYING AREA & 75°F EVERYWHERE ELSE.

OCCUPIED HEATING: (6:00 AM - 10:00 PM) - SET TEMPERATURE TO 68°F.

UNOCCUPIED COOLING: (10:00 PM - 6:00 AM) - SET TEMPERATURE TO 78°F.

UNOCCUPIED HEATING: (10:00 PM - 6:00 AM) - SET TEMPERATURE TO 64°F.

LIGHTING CONTROLLER:

R1: EMPLOYEE LIGHTING: (50% OF SALES, ASSOCIATE RESOURCES, OFFICE, BATHING & DRYING) - ON FROM 6:00 AM TILL 11:59 PM.

R2: CUSTOMER LIGHTING: (50% OF SALES & FISH LIGHTS) - ON 15 MINUTES BEFORE STORE OPEN AND OFF 30 MINUTES AFTER STORE CLOSURE. VERIFY OPENING SCHEDULE WITH STORE MANAGER FOR FINAL SETUP.

R3: EXTERIOR SIGNAGE: (PETSMART & GROOMING SIGNS) - ON FROM DUSK TILL 12:01 AM AND 5:00 AM TILL DAWN.

R4: EXTERIOR LIGHTING: (BUILDING & SITE LIGHTS) - ON DUSK TILL DAWN VIA EXTERIOR PHOTOCELL.

OVERRIDE SWITCHES:

OVERRIDE PUSH BUTTONS & TIMER SWITCHES SHALL TURN LIGHTS ON FOR TWO (2) HOURS, THEN AUTOMATICALLY REVERT TO SCHEDULED STATUS.

EQUIPMENT SCHEDULE
ENERGY MANAGEMENT SYSTEM

MARK	NAME	FURNISH BY M.C.	FURNISH BY E.C.	INSTALL BY M.C.	INSTALL BY E.C.	TERMINATIONS BY M.C.	TERMINATIONS BY E.C.	MOUNTING
1	NETWORK CONNECTION		X		X		X	1
2	POWER SUPPLY XFMR		X		X		X	1
3	TALISMAN MASTER CONTROLLER	X			X		X	1
4	T-STAT CONTROLLER	X			X	X		1
5	DUCT TEMPERATURE SENSOR	X		X		X		2
6	ZONE TEMPERATURE SENSOR	X		X		X		3
7	ROOF TOP UNIT	X		X		X		--
8	LIGHTING CONTROLLER	X			X		X	1
9	OUTDOOR LIGHT SENSOR	X			X		X	4
10	LIGHTING CONTACTOR CABINET		X		X		X	5
11	LIGHTING RELAY		X		X		X	6
12	LIGHTING CONTACTOR		X		X		X	6
13	INTERIOR OVERRIDE SWITCH	X			X		X	7
14	EXTERIOR OVERRIDE SWITCH		X		X		X	8

1. MOUNT ON TELEPHONE BOARD WHERE SHOWN ON ELEVATION "TELEPHONE BOARD" (2/E3.0).
2. MOUNT IN RTU SUPPLY DUCT AFTER COOLING COIL.
3. PROVIDE J-BOX & 1/2" CONDUIT TO JOIST SPACE OR 6" AFC. MOUNT WHERE SHOWN AT HEIGHT INDICATED ON "POWER PLAN" (1/E2.0).
4. MOUNT ON ROOF TOP UNIT WHERE SHOWN ON "POWER PLAN" (1/E2.0). MOUNT FACING NORTH, AIMED AWAY FROM AMBIENT LIGHT.
5. SEE "ONE LINE DIAGRAM" (1/E4.0).
6. MOUNT WITHIN LIGHTING CONTRACTOR CABINET.
7. PROVIDE J-BOX & 1/2" CONDUIT TO JOIST SPACE OR 6" AFC. MOUNT WHERE SHOWN AT HEIGHT INDICATED ON "LIGHTING PLAN" (1/E1.0).
8. MOUNT NEXT TO ELECTRICAL PANELS. SEE "LIGHTING PLAN" (1/E1.0).

LEGEND
ENERGY MANAGEMENT SYSTEM

MARK	TYPE	DESCRIPTION	MODEL	USAGE
A	———	4P / 24AWG CABLE UNSHIELDED SOLID COPPER CONDUCTORS	BERK-TEK CAT5E	NETWORK CABLE
B	- - - -	1P / 22AWG CABLE SHIELDED SOLID COPPER CONDUCTORS (BLACK / RED)	BELDEN 6520FE	ALL SENSORS
C	— - — -	3C / 22AWG CABLE SHIELDED STRANDED TINNED COPPER CONDUCTOR (BLACK / RED / CLEAR)	BELDEN 8771	BACNET BUS WIRE
D	———	8C / 18AWG THERMOSTAT CABLE INCLUDING 24VAC FROM RTU	T-STAT	T-STAT WIRE
E	— - — -	14AWG THHN WIRE	THHN	24V POWER
F	———	12AWG LINE (120V) VOLTAGE WIRE	THWN	GENERAL POWER

A

ROOM — VOLTS 208Y/120V 3P 4W — AIC 22,000
MOUNTING SURFACE — BUS AMPS 225 — MAIN BKR 150
FED FROM T1 — NEUTRAL 100% — LUGS FEEDTHRU

CKT #	CIRCUIT DESCRIPTION	KVA LOAD A	KVA LOAD B	KVA LOAD C	CKT BKR	CKT #	KVA LOAD A	KVA LOAD B	KVA LOAD C	CIRCUIT DESCRIPTION	CKT #
1	SPARE	0			20/1	40/3	3.3			WH-1	2
3	SPARE		0		20/1			3.3			4
5	SPARE			0	20/1				3.3		6
7	SPARE	0			20/1	20/1	0			SPARE	8
9	SPARE		0		20/1	20/1		0		SPARE	10
11	SPARE			0	20/1	20/1			0	SPARE	12
13	SPARE	0			20/1	20/1	0			SPARE	14
15	SPARE		0		20/1	20/1		0		SPARE	16
17	SPARE			0	20/1	20/1			0	SPARE	18
19	SPARE	0			20/1	20/1	0			SPARE	20
21	SPARE		0		20/1	20/1		0		SPARE	22
23	SPARE			0	20/1	20/1			0	SPARE	24
25	EWC	0.18			20/1	20/1	0			SPARE	26
27	EF-3		0.696		20/1	20/1		0		SPARE	28
29	EF-4			0.696	20/1	20/1			0	SPARE	30
31	RECIRC PUMP	0.696			20/1	30/3	2.5			EUH-1	32
33	DHU-1		0.696		20/1			2.5			34
35	SPARE			0	20/1				2.5		36
37	SPARE	0			20/1	20/1	0			SPARE	38
39	SPARE		0		20/1	20/1		0		SPARE	40
41	SPARE			0	20/1	20/1			0	SPARE	42
							12.6	10.6	12.4	TOTAL CONNECTED KVA	
	LUG LOAD: PANEL B	5.92	3.41	5.88			105	88.3	103	TOTAL CONNECTED AMPS	

LOAD TYPE	CONN. KVA	DEMAND KVA		LOAD TYPE	CONN. KVA	DEMAND KVA	
LIGHTING	1.47	1.84	(125%)	CONTINUOUS	0	0	(125%)
LARGEST MOTOR	0.696	0.87	(125%)	HEATING	17.4	17.4	(100%)
OTHER MOTORS	2.09	2.09	(100%)	NONCONTINUOUS	0	0	(100%)
RECEPTACLES	13.9	12	(50%>10)	KITCHEN EQUIP	0	0	(N/A)
				NONCOIN/DIVERSE	0	0	(N/A)
				TOTAL KVA:	35.6	34.2	

NOTES:

TOTAL BALANCED DEMAND AMPS: 94.8

B

ROOM — VOLTS 208Y/120V 3P 4W — AIC 22,000
MOUNTING SURFACE — BUS AMPS 225 — MAIN BKR MLO
FED FROM A — NEUTRAL 100% — LUGS STANDARD

CKT #	CIRCUIT DESCRIPTION	KVA LOAD A	KVA LOAD B	KVA LOAD C	CKT BKR	CKT BKR	KVA LOAD A	KVA LOAD B	KVA LOAD C	CIRCUIT DESCRIPTION	CKT #
1	FIRE ALARM	0.18			20/1	20/1	1.9			SIGNAGE	2
3	RECEP-IG-TTB		0.18		20/1	20/1		0.174		BATH FANS & LTS	4
5	RECEP-IG-SECURITY			0.18	20/1	20/1			0.54	RECEP-SHOW WINDOW	6
7	EMS SYSTEM	0.18			20/1	20/1	0.6			LTS-AQUARIUM	8
9	SPARE		0		20/1	20/1		0.18		RECEP-AQ FILTER#1	10
11	DOORBELL, DOORBELL XFMR			0.72	20/1	20/1			0.18	RECEP-AQ FILTER#2	12
13	RECEP-AUDIO	0.36			20/1	20/1	0.18			RECEP-DRYER	14
15	RECEP-IG-DATA RACK		0.36		20/1	20/1		0.18		RECEP-DRYER	16
17	SPARE			0	20/1	20/1			0.18	RECEP-DRYER	18
19	RECEP-SECURITY	0.18			20/1	20/1	0			SPARE	20
21	SPARE		0		20/1	20/1		0.18		RECEP-MASTER DRYER	22
23	RECEP-TAG MACHINE			0.18	20/1	20/1			0.36	RECEP-GFI	24
25	RECEP-SCRUBBER	0.18			20/1	20/1	0.36			RECEP-RESTROOM	26
27	RECEP-FRIG		0.18		20/1	20/1		0.18		COLUMN RECEP	28
29	RECEP-MICROWAVE			1.2	20/1	20/1			0.54	BIRD DET. RECEP	30
31	RECEP-FRIG	0.18			20/1	20/1	0.36			RECEP-CASHWRAP	32
33	SPARE		0		20/1	20/1		0.72		RECEP-SALON CHECK IN	34
35	RECEP - IG			0.18	20/1	20/1			0.54	RECEP	36
37	OFFICE RECEP - IG	0.54			20/1	20/1	0.72			RECEP-SALON	38
39	RECEP - IG CASHWRAP		0.36		20/1	20/1		0.72		RECEP-SALON	40
41	RECEPTACLE-IG			0.36	20/1	20/1			0.72	RECEP-ROOF, RECEP-WP	42
							5.92	3.41	5.88	TOTAL CONNECTED KVA	
							49.3	28.5	49	TOTAL CONNECTED AMPS	

LOAD TYPE	CONN. KVA	DEMAND KVA		LOAD TYPE	CONN. KVA	DEMAND KVA	
LIGHTING	1.47	1.84	(125%)	CONTINUOUS	0	0	(125%)
LARGEST MOTOR	0	0	(125%)	HEATING	0	0	(100%)
OTHER MOTORS	0	0	(100%)	NONCONTINUOUS	0	0	(100%)
RECEPTACLES	13.7	11.9	(50%>10)	KITCHEN EQUIP	0	0	(N/A)
				NONCOIN/DIVERSE	0	0	(N/A)
				TOTAL KVA:	15.2	13.7	

NOTES:

TOTAL BALANCED DEMAND AMPS: 38.1

H

ROOM — VOLTS 480Y/277V 3P 4W — AIC 22,000
MOUNTING SURFACE — BUS AMPS 250 — MAIN BKR MLO
FED FROM UTILITY — NEUTRAL 100% — LUGS STANDARD

CKT #	CIRCUIT DESCRIPTION	KVA LOAD A	KVA LOAD B	KVA LOAD C	CKT BKR	CKT BKR	KVA LOAD A	KVA LOAD B	KVA LOAD C	CIRCUIT DESCRIPTION	CKT #
1	SALES LTS	1.89			20/1	30/3	7.5			RTU-1	2
3	SALES LTS		1.3		20/1			7.5			4
5	OFFICE/GROOM/CANOPY LTS			1.05	20/1				7.5		6
7	EM/NIGHT LTS	1.18			20/1	25/3	6			RTU-2	8
9	EXTERIOR LTS		0.03		20/1			6			10
11	SPARE			0	20/1				6		12
13	SPARE	0			20/1	20/1	0			SPARE	14
15	SPARE		0		20/1	20/1		0		SPARE	16
17	SPARE			0	20/1	20/1			0	SPARE	18
19	SPARE	0			20/1	20/1	0			SPARE	20
21	SPARE		0		20/1	20/1		0		SPARE	22
23	SPARE			0	20/1	20/1			0	SPARE	24
25	SPARE	0			20/1	20/1	0			SPARE	26
27	SPARE		0		20/1	20/1		0		SPARE	28
29	SPARE			0	20/1	20/1			0	SPARE	30
31	SPARE	0			20/1	20/1	0			SPARE	32
33	SPARE		0		20/1	20/1		0		SPARE	34
35	SPARE			0	20/1	20/1			0	SPARE	36
37	XFMR T1	12.5			70/3	30/3	0.833			LIFT	38
39			11.6					0.833			40
41				11.5					0.833		42
							29.9	27.3	26.9	TOTAL CONNECTED KVA	
							108	98.4	97	TOTAL CONNECTED AMPS	

LOAD TYPE	CONN. KVA	DEMAND KVA		LOAD TYPE	CONN. KVA	DEMAND KVA	
LIGHTING	6.92	8.65	(125%)	CONTINUOUS	0	0	(125%)
LARGEST MOTOR	22.5	28.1	(125%)	HEATING	17.4	17.4	(100%)
OTHER MOTORS	23.3	23.3	(100%)	NONCONTINUOUS	0	0	(100%)
RECEPTACLES	13.9	12	(50%>10)	KITCHEN EQUIP	0	0	(N/A)
				NONCOIN/DIVERSE	0	0	(N/A)
				TOTAL KVA:	84	89.4	

NOTES:

TOTAL BALANCED DEMAND AMPS: 108

NOTES
PANEL SCHEDULES

L PROVIDE BREAKER WITH "LOCK-ON" DEVICE
C CIRCUIT THRU CONTACTOR FOR EMS CONTROL
G G.F.C.I. CIRCUIT BREAKER
H CIRCUIT BREAKER SHALL BE HACR RATED

STATE OF NEW YORK — WILLIAM D. BASH — LICENSED PROFESSIONAL ENGINEER — No. 071758 — 6.27.14

ONE--LINE & DETAILS

Store No. 2521

437 STATE ROUTE 104E
OSWEGO, NY 13126

PETSMART®

No:	ISSUE:	DATE:
	ISSUED FOR PERMIT / BID	06/27/14

modaH DESIGN
23 Wayne Ave., Dayton, OH 45402

Job No: 14047
Scale: As indicated
Drawn: MSW
Checked: MT/JS
Sheet No: E4.0